**WHAT IS CLAIMED IS:**

1. A nanocrystallite comprising

a nanocrystalline core comprising MTe,

wherein M is selected from the group consisting of Cd, Zn, Mg, and Hg, and the core photoluminesces with a quantum efficiency of at least 20%.

2. The nanocrystallite according to claim 1, wherein the nanocrystallite photoluminesces with a quantum efficiency of at least 30%.

3. The nanocrystallite according to claim 1 , wherein the nanocrystallite photoluminesces with a quantum efficiency of at least 40%.

4. The nanocrystallite according to claim 1, wherein the nanocrystallite photoluminesces with a quantum efficiency of at least 50%.

5. The nanocrystallite according to claim 1, wherein the nanocrystallite photoluminesces with a quantum efficiency of at least 60%.

6. The nanocrystallite according to claim 1, wherein the nanocrystallite photoluminesces with a quantum efficiency of at least 70%.

7. The nanocrystallite according to claim 1, wherein the nanocrystallite is a member of a population having a size distribution with a standard deviation no greater than 15% of a mean diameter of the population.

8. The nanocrystallite according to claim 1, wherein the nanocrystallite comprises CdTe.

9. The nanocrystallite according to claim 8, wherein the nanocrystallite photoluminesces at a wavelength in the range of 435 to 800 nm.

10. The nanocrystallite according to claim 1, wherein the nanocrystallite photoluminesces with a full-width at half maximum (FWHM) of 70 nm or less.

~~11. The nanocrystallite according to claim 10, wherein the FWHM is 45 nm or less.~~

~~12.~~ 1 A nanocrystallite, comprising:

a nanocrystalline core comprising MTe, wherein M is selected from the group consisting of Cd, Zn, Mg, and Hg; and

an overcoating of a semiconductor material on a surface of the core.

~~13.~~ 2. The nanocrystallite according to claim ~~12~~ 1, wherein the nanocrystallite photoluminesces with a quantum efficiency of at least 20%.

~~14.~~ 3. The nanocrystallite according to claim ~~12~~ 1, wherein the nanocrystallite photoluminesces with a quantum efficiency of at least 40%.

~~15.~~ 4. The nanocrystallite according to claim ~~12~~ 1, wherein the nanocrystallite photoluminesces with a quantum efficiency of at least 60%.

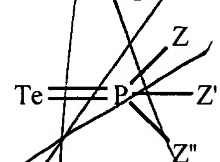
~~16.~~ 5. The nanocrystallite according to claim ~~12~~ 1, wherein the nanocrystallite photoluminesces with a quantum efficiency of at least 70%.

~~17.~~ 6. The nanocrystallite according to claim ~~12~~ 1, wherein the core is a member of a population having a size distribution with a standard deviation no greater than 15% of a mean diameter of the population.

~~18.~~ 7. The nanocrystallite according to claim ~~12~~ 1, wherein the core comprises CdTe.

19. A method of manufacturing nanocrystallites, comprising

injecting into a coordinating solvent an M-containing compound, M being selected from the group consisting of Cd, Zn, Mg, and Hg, and a Te-containing compound of the form



wherein one of Z, Z', and Z" comprises an amide, to form a mixture; and

heating the mixture to grow the nanocrystallites.

20. The method according to claim 19, wherein the Te-containing compound has a boiling point of at least 200°C at atmospheric pressure.

21. The method according to claim 19, wherein each of Z, Z', and Z" is an amide.

22. The method according to claim 19, wherein each of Z, Z', and Z", independently, is -N(A)(A'), wherein each of A and A', independently, is alkyl, alkenyl, aryl, cycloalkyl, or cycloalkenyl.

23. The method according to claim 21, wherein each amide, independently, is a dialkyl amide.

24. The method according to claim 19, further comprising mixing the Te-containing compound and the M-containing compound prior to injecting.

25. The method according to claim 19, further comprising adding additional M-containing compound, additional Te-containing compound, or a mixture thereof, during heating.

26. The method according to claim 19, wherein the Te-containing compound and the M-containing compound are injected sequentially.

27. The method according to claim 19, wherein the Te-containing compound and the M-containing compound are injected substantially simultaneously.

28. The method according to claim 19, further comprising growing an overcoating of a semiconductor on a surface of the nanocrystallite.

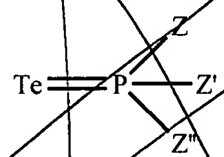
29. The method according to claim 19, further comprising separating a size of nanocrystallite by size selective precipitation.

30. The method according to claim 29, wherein an amine is added to the nanocrystallites during size selective precipitation.

31. The method according to claim 19, wherein the nanocrystallite photoluminesces with a full-width at half maximum (FWHM) of 70 nm or less.

32. The method according to claim 19, wherein the FWHM is 45 nm or less.

33. A Te-containing compound having the formula



wherein each of Z, Z', and Z", independently, is an amide, alkyl, alkenyl, aryl, cycloalkyl, or cycloalkenyl, and at least one of Z, Z', and Z" is an amide.

34. The Te-containing compound of claim 33, wherein each of Z, Z', and Z" is a dialkyl amide.

35. A method of preparing a Te-containing compound comprising contacting P(Z)(Z')(Z") with Te, wherein each of Z, Z', and Z", independently, is an amide, alkyl, alkenyl, aryl, cycloalkyl, or cycloalkenyl, and at least one of Z, Z', and Z" is an amide.

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